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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 09/942,131
Filing Date: August 29, 2001
Appellant(s): HOULT ET AL.

Wesley W. Whitmyer, Jr.
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed on May 8, 2006 appealing from the Office action mailed February 10, 2006.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

This appeal involves claims 1, 3-13 and 25-44.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

No amendment after final has been filed.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

6274871	Dukor	8-2001
6396048	Schanz	5-2002
5512749	Iddan	4-1996
5712685	Dumas	1-1998
5091646	Taylor	2-1992
5120953	Harris	6-1992

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1, 3-6, 13 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dukor (US Patent 6,274,871) in view of Schanz (US Patent 6,396,048 B1).

Regarding claims 1 and 25, Dukor discloses an IR microscope (See Figure 3) comprising a sample stage (element 90), optical components (elements 72, 70, beamsplitter in box 52, etc.) for guiding analyzing radiation (element 54) so that it is incident on a sample (element 10) to be

analyzed which is carried on said stage (see figure 3), and optical components (elements 74, 76, 78), for guiding radiation from the sample to a detector (element 62)

Wherein the detector (element 62) comprises an array of individual detector elements (element 92). Dukor further discloses an array of pixels or detection elements, and describes an example of a 64 x 64 array. However, Dukor does not limit the size of detection array, and further states that such a variable is dependent upon the desired detection resolution (column 6, lines 26-30).

Dukor does not specify that the outputs of the detector elements are directly fed in parallel to an image processing means. However, Schanz et al. discloses individual detector elements (column 2, lines 37-39, figure 1, element 10), the output of the detector elements (figure 2, out put from element 52) being fed in parallel as each element is read out individually to processing means (element 30) for processing the detector element outputs. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have used the parallel processor as disclosed by Schanz with the invention disclosed by Dukor as parallel image processing would increase the speed at which the data is processed.

Regarding claims 3-6 Dukor discloses an array of detector elements (elements 92 and 62). It is inherent that a detector array includes elements or pixels (element 92) in a linear arrangement that are carefully spaced rows and columns, as such pixels are individually addressed.

Regarding claim 13, Schanz discloses a processor (element 30) that processes output signals received from the detector array.

Claim 26-43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dukor (US Patent 6,274,871) in view of Schanz (US Patent 6,396,048 B1) further in view of Iddan (US Patent 5,512,749 A).

Regarding claim 26, Dukor in view of Schanz discloses the limitations set forth in claim 25 but does not specify that the detector is located in a Dewar typed vessel. However Iddan discloses that the detector elements can be located in a Dewar type vessel (column 2, lines 35-40). One of ordinary skill in the art would be motivated to use a Dewar type vessel to house the detector elements in order to cool the detector to reduce effects of the detector heating that lead to erroneous detection data.

Regarding claim 27 Iddan discloses each detector element corresponds to a pixel and thus is in a 1:1 relationship, meaning that the center to center spacing of adjacent detector elements is equal to the pixel pitch (see figure 2).

Regarding claim 28, Iddan discloses an assembly (Figure 1, element 18) that can be moved into or out of the beam of radiation in order to change the magnification provided by the optical elements of the microscope (Column 3, lines 44-55).

Regarding claim 29, Iddan further discloses that the magnification assembly is located between the objective mirror (Figure 1, element 44) and its intermediate focus (element 28).

Regarding claim 30, Iddan further discloses that the magnification assembly includes a reflecting element (Figure 1, element 44) that reflects the beam of radiation away from its normal direction and a component that receives the reflected radiation (element 26).

Regarding claim 31, Iddan discloses the claimed invention except for a second magnifying component. It would have been obvious to one having ordinary skill in the art at the

time the invention was made to have included a second magnifying component, since it has been held that mere duplication of the essential working parts of device involves only routine skill in the art. *St Regis Paper Co. v. Bemis Co.,* 549 F2d 833, 193 USPQ 8(CA 71977).

Regarding claims 32-33, Iddan does not specify the use of spherical or plane mirrors, however it is well known in the optical art to use these types of mirrors for directing and magnifying radiation.

Regarding claim 34, the magnifying assembly (element 18) is moveable by the rotation about an axis. However, Iddan does not disclose the use of the operative or inoperative state. Although he does not specify that the magnifying assembly has 2 states, an operative an inoperative state, it would have been obvious to one having ordinary skill in the art at the time the invention was made to define an in use state and a nonuse state, as it is only a matter of convention.

Regarding claims 35-36, Iddan discloses a mirror (element 44) that has two operative positions, one that allows the CCD camera to detect an image, and another that allows for magnification and detection of IR radiation. Iddan does not specify that the magnification assembly is the element that causes a position in which the radiation can propagate to the detector without magnification. However, since the operative positions of the mirror function similarly as the claimed magnification element, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use the mirror element that rotates about 45 degrees about an axis.

Regarding claims 37 and 38, Iddan discloses a cold shield (element 36) that is responsible for reducing spurious IR radiation impinging on the detector (see column 3, lines 63-67).

Although he does not specify that the shield has 2 states, an operative an inoperative state, it would have been obvious to one having ordinary skill in the art at the time the invention was made to define an in use state and a nonuse state, as it is only a matter of convention.

Regarding claim 39, Iddan further discloses optical elements (element 26) where a beam of rays to be detected passes and the desired radiation is focused onto the detector. Although Iddan does not specify the use of a plane mirror, it is well known in the art to use various types of mirrors and lenses to direct and focus desired radiation onto a detector.

Regarding claim 40, Dukor discloses an IR microscope (See Figure 3) comprising a sample stage (element 90), optical components (elements 72, 70, beamsplitter in box 52, etc.) for guiding analyzing radiation (element 54) so that it is incident on a sample (element 10) to be analyzed which is carried on said stage (see figure 3), and optical components (elements 74, 76, 78), for guiding radiation from the sample to a detector (element 62),

Wherein the detector (element 62) comprises an array of individual detector elements (element 92). Dukor further discloses an array of pixels or detection elements, and describes an example of a 64 x 64 array. However, Dukor does not limit the size of detection array, and further states that such a variable is dependent upon the desired detection resolution (column 6, lines 26-30). Further Dukor discloses the use of a CCD (column 2 lines 46-49) that inherently has a plurality of individual detector elements or pixels that are disposed in a spaced relationship. Dukor does not specify that the center to center spacing is equal to or a multiple of the pixel pitch and further does not disclosed that the outputs of the detector elements are directly fed in parallel to an image processing means with its own detection circuitry. However, Schanz discloses an array of individual detector elements (column 2, lines 37-39, figure 1, element 10),

the output of the detector element (see figure 2, output from element 52) being fed in parallel (figure 2) to processing means (element 30) for processing the detector element outputs. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have used the parallel processor as disclosed by Schanz with the invention disclosed by Dukor as parallel processing would increase the speed at which the data is processed.

However, Dukor in view of Schanz et al. does not specify that the center to center spacing is equal to or a multiple of the pixel pitch. Iddan discloses each detector element corresponds to a pixel and thus is in a 1:1 relationship, meaning that the center to center spacing of adjacent detector elements is equal to the pixel pitch (see figure 2). One of ordinary skill in the art would be motivated to use the pixel relationship as disclosed by Iddan with the invention as disclosed by Dukor in view of Schanz in order to proportionally detect radiation with respect to the image produced to reduce distortions to the detected image.

Regarding claim 41, Dukor discloses that the use of a CCD (column 2, lines 46-49) which inherently is made of a photoconductive element.

Regarding claim 42, Iddan discloses a shield (column 2, lines 40-45), for shielding at least one of the detector elements from unwanted radiation (column 2, lines 40-45). Although it does not explicitly state that the shield is in an operative or inoperative state, the shield is like a shutter and has the ability to change in size and therefore can open to an optimum operative state.

Regarding claim 43, Iddan discloses that the shield is located internal to the Dewar vessel. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have placed the shield external to the Dewar vessel, since it has been held

that rearranging parts of an invention only involves routine skill in the art. *In re Japikse,* 181 F2d 1019, 86 USPQ 70 (CCPA 1950).

Claims 8-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dukor (US Patent 6,274,871) in view of Schanz (US Patent 6,396,048 B1) further in view of Dumas (US Patent 5,712,685).

The limitations set forth in the corresponding independent claims have been described in the abovementioned paragraphs.

Regarding claims 8-12 Dukor in view of Schanz does not specifically disclose that the detector elements are located at a position corresponding to a point on a grid. However, Dumas discloses a device to enhance detector resolution, including the use of a grid wherein detector elements are positioned corresponding to points on the grid (figure 3, Column 6, lines 5-19) and can be fashioned in various of grid/detector element configurations. Further Dumas discloses that the grid pattern is rectangular (figure 3). It would have been obvious to one having ordinary skill in the art at the time the invention was made to have used the specific detector device as disclose by Dumas with the invention disclosed by Dukor in view of Schanz, in order to enhance image resolution.

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Dukor (US Patent 6,274,871) in view of Schanz (US Patent 6,396,048 B1) further in view Taylor (US Patent 5,091,646 A)

Regarding claim 7, Dukor in view of Schanz discloses the limitations set forth in claim 5, but does not disclose that the detector elements are staggered relative to an adjacent row.

Staggered rows of detectors is a conventional detector configuration. Taylor discloses such a conventional detector configuration (see claim 19).

Claim 44 is rejected under 35 U.S.C. 103(a) as being unpatentable over Dukor (US Patent 6,274,871) in view of Schanz (US Patent 6,396,048 B1) further in view Harris (US Patent 5,123,953).

Regarding claim 44, Dukor discloses an IR microscope (See Figure 3) comprising a sample stage (element 90), optical components (elements 72, 70, beamsplitter in box 52, etc.) for guiding analyzing radiation (element 54) so that it is incident on a sample (element 10) to be analyzed which is carried on said stage (see figure 3), and optical components (elements 74, 76, 78), for guiding radiation from the sample to a detector (element 62)

Wherein the detector (element 62) comprises an array of individual detector elements (element 92). Dukor further discloses an array of pixels or detection elements, and describes an example of a 64 x 64 array. However, Dukor does not limit the size of detection array, and further states that such a variable is dependent upon the desired detection resolution (column 6, lines 26-30). Dukor does not specify that the outputs of the detector elements are fed in parallel to a processing means and further does not disclose an assembly moveable between an operative and inoperative position by rotation about an axis in order to change the magnification provided by the optical elements of the microscope. However, Schanz discloses individual detector elements (column 2, lines 37-39), the output of the detector element (Figure 2, output from element 52) being fed in parallel to processing means (element 30) for processing the detector element outputs. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have used the parallel processor as disclosed by Schanz with the

invention disclosed by Dukor as parallel processing would increase the speed at which the data is processed. Dukor in view of Schanz does not disclose an assembly movable between an operative an inoperative position by rotation about an axis in order to change the magnification provided by the optical elements of the microscope. Harris discloses a microscope that is moveable between an operative and inoperative position to change the magnification provided by the optical elements (i.e. condenser) of the microscope (claims 1 and 18). One of ordinary skill in the art would be motivated to have such an assembly so as to have an adaptable field of view.

(10) Response to Argument

Response corresponding to Arguments (1) (A) and 2(A)

Applicant argues that neither Dukor or Schanz teach an array of 3-100 detector elements, and also argues that the Dukor reference teaches using a 64 x 64 array of detector elements.

In all imaging systems, whether infrared, visible, ultraviolet, x-ray, etc., there is the inherent desire to produce images that are appropriate in resolution for a given application for a given object. Appropriate image resolution (i.e. detector size as well as the number of pixels) is determined by the size of the object as well as the features of the object. For example, a large object requires a large detector and depending on the feature size, a large array of pixels. The advantage of having a detector with a large number of pixels is that it allows for more accurate detection of smaller features, however this advantage carries a cost- a longer processing time, because more information is generated by the detector. The advantage of a small number of pixels is that it requires less processing, thus quicker image production, however this sacrifices the accuracy and ability to distinguish smaller features of the object. The most important factor

(smallest feature size, image processing time, object size) dictates the size and number of pixels of the detector.

Applicant argues that Dukor teaches more detector elements are better because it cites an exemplary 64 x 64 array, and further argues that Dukor teaches away from having small detector 3-100 elements). Dukor discloses a 64 x 64 array as merely an example of the number of elements. However, as stated in the above paragraph, the object to be imaged dictates the selection of the number of detector elements. The motivation to reduce the number of elements is to reduce the amount of processing required to produce an image.

Applicant further argues that there is no motivation in the cited prior art to use a smaller detector array. The examiner respectfully disagrees as the motivation is based on knowledge generally available to one of ordinary skill in the art. It is well known to adjust the number of detector elements based upon the desired resolution/object size.

Applicant further argues that hindsight knowledge was used to support an obviousness rejection. The examiner respectfully disagrees. It has been a well known fact that increasing the number of pixels increases the amount of processing because a greater volume of data is generated. For example, a detector with a given area A comprising a 10 x10 array of pixels will generate more detection data than another detector with the same area A comprising a 4x 4 array. Although the imaging area is the same, the increased number of elements generates a larger amount of detection data that must be processed to form an image. The motivation for using a smaller detector is to reduce the amount of time required to process detection data.

Response corresponding to Argument (1) (B)

Applicant argues that there is no motivation to combine Dukor with Schanz. However, as stated in the previous office action, Dukor teaches parallel processing of the detection elements (see Column 1, lines 31-44) but does not disclose the specifics of the processor.

Schanz et al. discloses a conventional detection device with individual detector elements (column 2, lines 37-39, figure 1, element 10), where the output of the detector elements (figure 2, out put from element 52) are fed in parallel as each element is read out individually to processing means (element 30) for processing the detector element outputs. The purpose in citing Schanz was to demonstrate the specifics of parallel processing for imaging systems. Applicant argues that Schanz recites an optical detector while Dukor recites an IR detector and that there is no motivation to combine the references. However, as stated above, Dukor discloses using parallel processing techniques to process the detected data but does not disclose the specifics. Schanz was merely cited to demonstrate how conventional parallel processors function within an imaging system. Because Dukor discloses parallel processing, one of ordinary skill in the art would be motivated to adapt an use a conventional parallel processor. Further, parallel processing in any detector involves reading out electrical charges in a specified manner. The processing step is after the detection step, thus it is obvious that a processor from a visible detector may be used in an IR detector as the function of the parallel processor is the same- to read out electrical charges in parallel.

Response corresponding to Argument 2(B)

Applicant argues that Iddan teaches away from providing detector elements that are directly fed in parallel to image processing circuitry and also argues that Iddan teaches

multiplexing. However, Iddan was not cited to address this limitation. Iddan was cited to support the particular pixel pitch/spacing limitation of the claim.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

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